



Chapter A4.

COLLECTION OF WATER SAMPLES

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ABSTRACT

The *National Field Manual for the Collection of Water-Quality Data* (*National Field Manual*) describes protocols and provides guidelines for U.S. Geological Survey (USGS) personnel who collect data that are used to assess the quality of the Nation's surface-water and ground-water resources. This chapter provides information and addresses appropriate methods for the collection of surface-water, ground-water, and associated quality-control samples. Among the topics covered are procedures to prevent sample contamination; instructions for collecting isokinetic, depth-integrated samples from streams; and guidelines and criteria for purging wells in preparation for collecting samples from ground water.

Each chapter of the *National Field Manual* is published separately and revised periodically. Newly published and revised chapters will be announced on the USGS Home Page on the World Wide Web under "New Publications of the U.S. Geological Survey." The URL for this page is <http://water.usgs.gov/lookup/get?newpubs>.

INTRODUCTION

As part of its mission, the U.S. Geological Survey (USGS) collects the data needed to assess the quality of our Nation's water resources. The *National Field Manual for the Collection of Water-Quality Data (National Field Manual)* describes protocols (requirements and recommendations) and provides guidelines for USGS personnel who collect those data on surface-water and ground-water resources. Chapter A4 provides information about the collection of water samples for investigations and assessments of environmental water quality. **Formal training and field apprenticeship are necessary in order to implement correctly the procedures described in this chapter.**

The *National Field Manual* is Section A of Book 9 of the USGS publication series "Techniques of Water-Resources Investigations" (TWRI) and consists of individually published chapters designed to be used in conjunction with each other. Chapter numbers are preceded by an "A" to indicate that the report is part of the *National Field Manual*. Other chapters of the *National Field Manual* are referred to in this report by the abbreviation "NFM" and the specific chapter number (or chapter and section number). For example, NFM 6 refers to Chapter A6 on "Field Measurements" and NFM 6.4 refers to the section on field measurement of pH.

The procedures described in this chapter represent protocols that are generally applicable to USGS studies involving the collection of water-quality data. Modification of required and recommended procedures to fulfill study objectives or to enhance data quality must be documented and published with the data and data interpretation.

PURPOSE AND SCOPE

The *National Field Manual* is targeted specifically toward field personnel in order to (1) establish and communicate scientifically sound methods and procedures, (2) provide methods that minimize data bias and, when properly applied, result in data that are reproducible within acceptable limits of variability, (3) encourage consistent use of field methods for the purpose of producing nationally comparable data, and (4) provide citable documentation for USGS water-quality data-collection protocols.

The purpose of this chapter of the *National Field Manual* is to provide field personnel and other interested parties with a description of the requirements, recommendations, and guidelines routinely used in USGS studies involving the collection of water-quality samples. The information provided covers topics fundamental to the collection of water samples that are representative of the ambient environment. The information provided does not attempt to encompass the entire spectrum of data-collection objectives, site characteristics, environmental conditions, and technological advances related to water-quality studies. Also beyond the scope of this chapter is discussion of procedures to collect samples for analysis of suspended or biological materials.

REQUIREMENTS AND RECOMMENDATIONS

As used in the *National Field Manual*, the terms **required** and **recommended** have USGS-specific meanings.

Required (require, required, or requirements) pertains to USGS protocols and indicates that USGS Office of Water Quality policy has been established on the basis of research and (or) consensus of the technical staff and reviewed by water-quality specialists and selected District¹ or other professional personnel, as appropriate. Technical memorandums or other internal documents that define the policy pertinent to such requirements are referenced in this chapter. Personnel are instructed to use required equipment or procedures as described herein. Departure from or modifications to the stipulated requirements that might be necessary to accomplishing specific data-quality requirements or study objectives must be based on referenced research and good field judgment, and be quality assured and documented.

¹District refers to an office of the USGS, Water Resources Division, located in any of the States or territories of the United States.

Recommended (recommend, recommended, recommendation) pertains to USGS protocols and indicates that, on the basis of research and (or) consensus, the USGS Office of Water Quality recognizes one or several acceptable alternatives for selecting equipment or procedures. Specific data-quality requirements, study objectives, or other constraints might affect the choice of recommended equipment or procedures. Selection from among the alternatives must be based on referenced research and good field judgment, and reasons for the selection should be documented. Departure from or modifications to recommended procedures must be quality assured and documented.

FIELD MANUAL REVIEW AND REVISION

Chapters of the *National Field Manual* will be reviewed, revised, and reissued periodically to correct any errors, incorporate technical advances, and address additional topics. Comments or corrections can be mailed to NFM-QW, USGS, 412 National Center, Reston, VA 20192 (or direct electronic mail to nfm-owq@usgs.gov). Information regarding the status and any errata of this or other chapters can be found near the beginning of the electronic version of each chapter, located in the Publications section of the following Web site: <http://water.usgs.gov/lookup/get?owq>. Newly published and revised chapters will be announced on the USGS Home Page on the World Wide Web under “New Publications of the U.S. Geological Survey,” at <http://water.usgs.gov/lookup/get?newpubs>.

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